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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/673,173

09/30/2003

Yukihiko Nakata

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02/02/2007

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.

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EXAMINER

BUEKER, RICHARD R

ART UNIT

PAPER NUMBER

1763

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
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3 MONTHS

02/02/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/673,173

Applicant(s)

NAKATA ET AL.

Examiner

Richard Bueker

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1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 October 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,8,9 and 11-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,8,9 and 11-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/30/2003</u> . | 6) <input type="checkbox"/> Other: _____ |

The reference identified as AY in applicants' IDS filed 12/30/03 has now been considered because a copy of this reference is now in the official record. A copy of the Form 1449 filed by applicants on 12/30/03 with the AY reference initialed is attached to this office action.

Claims 1-5, 8, 9 and 11-23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claims 1 and 2, line 6 of each, the word "support" is used in a non-idiomatic manner. Because of this non-idiomatic usage, it is unclear if the claims are intended to recite that each of the light transmitting windows are supported by the "support member", or alternatively, that the light transmitting windows are supported by the "beams fixed on the support member". Also, claim 11 is vague and indefinite because it defines the structure of the apparatus in terms of the size of a substrate to be processed, but the substrate that is referred to is not a part of the apparatus. The claimed apparatus is capable of processing substrates of a wide variety of sizes, and the particular size of a substrate to be placed inside the apparatus is a process variable to be determined in the future. See *Ex Parte Brummer* 12 USPQ2d 1653.

Claim 5 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 5 recites a checkerboard pattern, which applicants

argue is supported by the "check pattern" of their fourth embodiment shown in Fig. 5. It is noted, however, that the embodiment shown in Fig. 5 does not include the beams that are now recited in claims 1 and 2, and therefore claim 5 as now written describes an apparatus that was not disclosed in the specification as originally filed.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 8, 9, 11 16, 17, 19 and 21-23 are rejected under 35 U.S.C. 103(a) as obvious over Sakuma I (WO 01/82348) or Sakuma II (6,891,131), either one in view of Hauf (6,600,138), and in further view of any one of Tolt (6,432,206), Murakami (5,431,738), Miller (6,521,048) or Wertheimer (4,728,863).

Sakuma I and II have equivalent disclosures and the discussion below will refer to Sakuma II (6,891,131). Sakuma (see fig. 9) discloses a substrate processing apparatus having a light source, a light transmitting window and a reaction chamber in which a substrate to be processed can be placed. Frame 66 and frames 72 of Sakura's apparatus form plural windows as claimed by applicants. The frame of Sakuma is a support member positioned on one surface of the reaction chamber, and having beams

fixed on the support member as now claimed in claims 1 and 2. Sakuma (col. 5, lines 19-32, for example) teaches that the purpose of his support member is to reduce the thickness of the transmitting window and thus reduce the window's heat capacity. See col. 8, lines 19-58 of Sakuma, for example. Sakuma teaches that the windows can be provided in a variety of shapes and patterns, including a lattice pattern (col. 8, lines 39-44) which creates windows arranged in a "checkerboard pattern" as recited in claim 5.

Hauf (see Figs. 1 and 16) also discloses a substrate processing apparatus having a light source, a light transmitting window and a reaction chamber in which a substrate to be processed can be placed. Hauf teaches that a single quartz window as shown in his Fig. 1 can be replaced by a plurality of quartz liners 166 (see Fig. 16) that are optically transparent (i.e. windows). The windows 166 are sealed by seals 169 to the inner wall 168, which is a support member. Hauf (see abstract) teaches that "(t)hin planar quartz liners may also be interposed between the lamps and the substrate. By eliminating thick planar quartz windows commonly used to isolate the lamps in prior art RTP systems, higher processing rates and improved reliability can be obtained." Thus, Hauf teaches that his plural windows 166 and support member 168 serve the same purpose as Sakuma's (see Fig. 9, for example) window 68 and support member 66 having beams 72. It would have been obvious to modify the apparatus of Sakuma by providing plural windows on the support member as taught by Hauf because Hauf teaches that his plurality of windows successfully accomplish the purpose desired by Sakuma, which is to reduce the thickness of a lamp window in a substrate processing apparatus.

Sakuma's apparatus also includes a substrate rotation means for improving the uniformity of radiation (col. 1, lines 31-35) onto the substrate per unit time. Sakuma does not discuss linearly moving the substrate holder relative to the windows. Tolt (6,432,206) (abstract), Murakami (5,431,738) (Fig. 7), Miller (6,521,048) (Fig. 17) or Wertheimer (4,728,863) (Figs. 1-4), all teach the step of moving a substrate in a linear reciprocating motion or swinging motion, for the purpose of causing a more uniform treatment of a substrate in a processing apparatus. These references teach that a swinging motion is a well-known alternative to or addition to the more common rotating motion illustrated by Sakuma. It would have been obvious to use such a swinging motion as an alternative to, or in addition to, the rotation of Sakuma, because the secondary references make clear that reciprocation or swinging was an art recognized equivalent to rotation, or an art recognized improvement to rotation used alone, for the purpose of increasing uniformity of treatment of a substrate in a processing apparatus.

Regarding new claims 21-23, the windows of Sakuma are juxtaposed. It is noted that the dictionary definition of "juxtaposed" is "placed side by side" or "adjacent".

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakuma I (WO 01/82348) or Sakuma II (6,891,131), either one in view of Hauf (6,600,138), and in further view of any one of Tolt (6,432,206), Murakami (5,431,738), Miller (6,521,048) or Wertheimer (4,728,863) for the reasons discussed above, and taken in view of Iwasaki (5,174,881) and Maeda (5,314,538) who teach that it is desirable to place another chamber adjacent to a lamp processing chamber of the type taught by Sakuma. It would have been obvious to one skilled in the art to adapt the apparatus of Sakuma

by placing it adjacent another chamber to allow plural processing steps as taught by Iwasaki and Maeda (5,314,538).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakuma I (WO 01/82348) or Sakuma II (6,891,131), either one in view of Hauf (6,600,138), and in further view of any one of Tolt (6,432,206), Murakami (5,431,738), Miller (6,521,048) or Wertheimer (4,728,863) for the reasons discussed above, and taken in view of Takasu (5,261,961) or Shinriki (6,143,081), who teach that it is desirable to place another chamber adjacent to a lamp processing chamber of the type taught by Sakuma. It would have been obvious to one skilled in the art to adapt the apparatus of Sakuma by placing it adjacent another chamber to allow plural processing steps as taught by Takasu or Shinriki.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakuma I (WO 01/82348) or Sakuma II (6,891,131), either one in view of Hauf (6,600,138), and in further view of any one of Tolt (6,432,206), Murakami (5,431,738), Miller (6,521,048) or Wertheimer (4,728,863) for the reasons discussed above, and taken in view of Takasu (5,261,961), Inayoshi (JP 2-182883) or Iwasaki (5,174,881), each of whom teaches that a low-pressure mercury lamp can be use for photochemical processing of a substrate held in a vacuum chamber, and it would have been obvious to use a low-pressure mercury lamp as the lamp of Sakuma in view of the teachings of Takasu, Inayoshi or Iwasaki.

Claims 14, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakuma I (WO 01/82348) or Sakuma II (6,891,131), either one in view of Hauf

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(6,600,138), and in further view of any one of Tolt (6,432,206), Murakami (5,431,738), Miller (6,521,048) or Wertheimer (4,728,863) for the reasons discussed above, and taken in view of taken in view of applicants' description of the prior art (see Fig. 12 and pages 3-6 of applicants' specification). As described by applicants, when xenon excimer lamps were conventionally used to irradiate the interior of vacuum chambers for photo-oxidation, the problems caused by the pressure differential across the chamber window was the same as described by Sakuma. Therefore, it would have been obvious to one skilled in the art to use the plural window system taught by Sakuma in the chamber of applicants' Fig. 12, to mitigate the same problems caused by pressure differential.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakuma I (WO 01/82348) or Sakuma II (6,891,131), either one in view of Hauf (6,600,138), and in further view of any one of Tolt (6,432,206), Murakami (5,431,738), Miller (6,521,048) or Wertheimer (4,728,863) for the reasons discussed above, and taken in view of Beinglass (5,576,059) (col. 1, lines 18-39, for example), who teaches that silicon semiconductor films are typically formed in the prior art in lamp heated chambers of the type taught by Sakuma, and it would have been obvious to deposit a doped polysilicon layer of the type described by Beinglass in the apparatus of Sakuma. Also, it is noted that Sakuma (col. 12, lines 28-32) teaches the step of depositing polysilicon in his chamber.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sakuma I (WO 01/82348) or Sakuma II (6,891,131), either one in view of Hauf (6,600,138), and in further view of any one of Tolt (6,432,206), Murakami (5,431,738), Miller (6,521,048)

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or Wertheimer (4,728,863) for the reasons discussed above, and taken in view of Iwasaki (5,174,881) and in further view of Shinriki (6,143,081), Beinglass (5,576,059) and Nakata (Asia Display/IDW '01). Iwasaki teaches that photo-etching is a desirable pretreatment step for a silicon wafer prior to forming a film on the wafer. Sakuma, Shinriki, Beinglass and Nakata all teach a step of forming a film on a semiconductor wafer by photo-process. It would have been obvious to one skilled in the art to pretreat the wafers in the process of Sakuma I or II, Shinriki, Beinglass and Nakata to remove a native oxide in the manner taught by Iwasaki.

Applicants have argued that none of Tolt, Murakami, Miller and Wertheimer would suggest linear movement or swinging as now recited. Applicants have further argued that Tolt, Murakami, Miller and Wertheimer are taken from the CVD art or plasma processing art which are different from a light processing apparatus as presently claimed. Applicants have argued in effect that Tolt, Murakami, Miller and Wertheimer are not analogous art.

As noted in the statement of the rejection, however, the Sakuma (I or II) apparatus also includes a substrate rotation means for improving the uniformity of radiation (col. 1, lines 31-35) onto the substrate per unit time. Therefore, Sakuma makes clear that substrate movement is desirable in a light processing apparatus for the purpose of improving the uniformity of radiation (col. 1, lines 31-35) onto the substrate per unit time.

According to *In re Wood*, 202 USPQ 171, and *In re Pagliaro*, 210 USPQ 888, analogous art is all art in the field of endeavor, plus those arts which are reasonably

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pertinent to the particular problem solved by the invention. According to this definition of analogous art, Tolt, Murakami, Miller and Wertheimer are analogous art because they are taken from an art that is reasonably pertinent to the problem solved by the invention.

Tolt (6,432,206) (abstract), Murakami (5,431,738) (Fig. 7), Miller (6,521,048) (Fig. 17) or Wertheimer (4,728,863) (Figs. 1-4), all teach the step of moving a substrate in a linear reciprocating motion or swinging motion, for the purpose of causing a more uniform treatment of a substrate in a processing apparatus. These references teach that a swinging motion is a well-known alternative to or addition to the more common rotating motion illustrated by Sakuma.

It would have been obvious to use such a swinging motion as an alternative to, or in addition to, the rotation of Sakuma, because the secondary references make clear that reciprocation or swinging was an art recognized equivalent to rotation, or an art recognized improvement to rotation used alone, for the purpose of increasing uniformity of treatment of a substrate in a processing apparatus.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

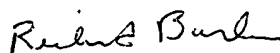
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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Bueker whose telephone number is (571) 272-1431. The examiner can normally be reached on 9 AM - 5:30 PM, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parvis Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Richard Bueker
Primary Examiner
Art Unit 1763